MODULE

Diarrheal Disease

For the Ethiopian Health Center Team

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Jimma University

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UNIT ONE

INTRODUCTION

1.1 Purpose and The Use of Module

The scarcity of relevant teaching or learning materials in the higher training institutions of Ethiopia has been one of the bottlenecks in affecting efficient task oriented and problem solving training. Preparation of a teaching material that will meet the aforementioned mission is an activity that should in no way be postponed or delayed.

Therefore, the purpose of this module is to enable students to develop adequate knowledge, attitude and practical skills through interactive and participatory learning. This module will help the health center team comprising of health officers, public health nurses, laboratory technicians and sanitarians to correctly identify cases of diarrhoea and manage them effectively as team members. For this reason separate satellite modules are prepared for each professional category of the health center team based on the tasks expected of them.

The module can also be used for training of the health center team who are already in the service giving sectors, in the basic training of clinical nurses, community health workers and caregivers. However, the module

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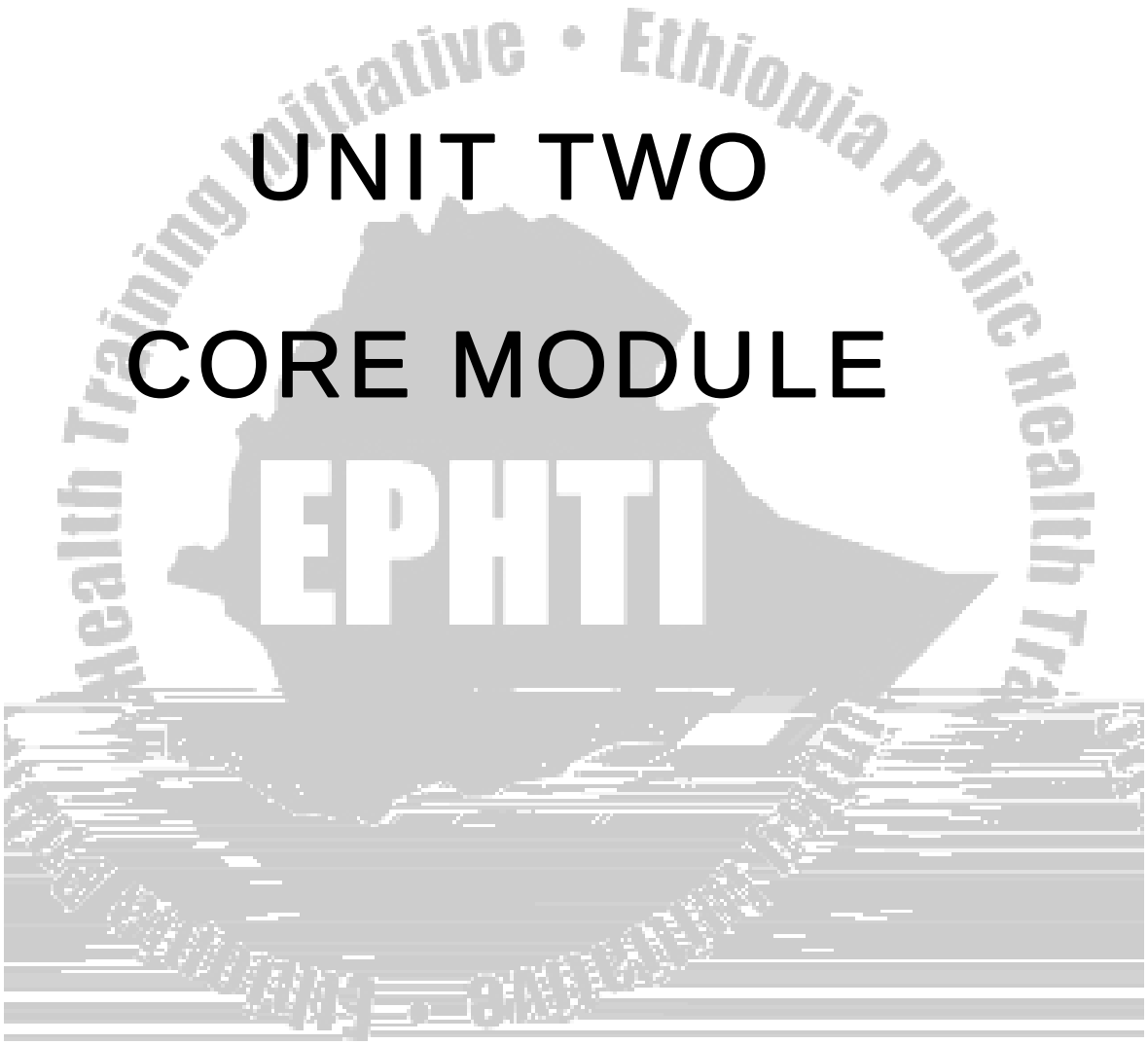
UNIT TWO

CORE MODULE



2.1 Pre and Post Test

4. Which of the following can enhance the absorption of sodium in the intestine (there may be more than one correct answer)

   A. Cooked rice water
   B. Cereal based ORT
   C. Plain sugar
   D. Some amino acids
   E. Glucose

5. For which of the following situations is ORT using ORS solution of food based ORT effective? (there may be more than one correct answer)

   A. Maintenance therapy for an infant with Rota virus diarrhea
   B. Rehydration of a child with cholera who is alert and able to drink
   C. Rehydration of a child with diarrhea and paralytic illius with abdominal distension
   D. Rehydration of a comatose child with severe dehydration and shock due to rotavirus diarrhea
   E. Maintenance therapy of a child with cholera, after being rehydrated

6. Which of the following are signs of severe dehydration?

   A. The skin pinch goes back slowly (within 2 seconds)
   B. The child is very lethargic
   C. The child is unable to drink
   D. The eyes are slightly sunken
   D. The mouth & tongue are very dry

7. Which of the following is not an etiological agent responsible for the development of diarrhea?

   A. Giardia lamblia
   B. Vibro cholera
   C. Shigella dysenteriae
   D. E.histolytica
   E. None of the above

8. Bacillary dysentery is caused by
   A. Viruses
   B. Bacteria
   C. Parasites
   D. Fungus
   E. All of the above

9. The specimen used for microscopic investigation of the causes of diarrhoeal diseases is
   A. Blood
   B. Stool
   C. Urine
   D. Sputum

10. Extra intestinal amebiasis is caused by
   A. E.histolytica
   B. G.lamblia
   C. Shigella
   D. Viruses
   E. All of the above

11. Which one of the following statements is not true?
   A. Microorganisms can cause acute or chronic diarrhea
   B. Acute diarrhea is caused by microorganisms only
   C. Microorganisms are not the only causes of acute or chronic diarrhea
   D. A and B
   F. A and C

12. What is the common way of diarrhoeal disease transmission
   A. Through contaminated water
   B. Through contaminated food
   C. Through contaminated spoil
   D. Through contaminated hand

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17. When you are teaching and demonstrating how to prepare ORS at home, Which one of the following is wrong?

A. Washing of hands before and after preparation of ORS solution.

B. The ORS Should be mixed with 500 ml of clean water.

C. Instructing the mother to give frequent small sips using a cup or spoon.

D. Instructing the mother to continue giving extra flui

2.1.2 Pre and Post Test for Specific Categories of The Health Center Team

2.1.2.1. For Health Officers

1. In which of the following situation is it correct to give an antibiotic to a child with diarrhoea (there may be more than one correct answer)
   A. The child has had bloody diarrhoea with fever for 2 days.
   B. The child has had watery diarrhoea with fever for 2 days.
   C. The child has fever, dehydration from acute watery diarrhoea and cases of cholera
   D. The child has had diarrhoea for 12 days and shows signs of dehydration and weight loss.
   E. A child who has rota virus diarrhea

2. Which one of the following complications of severe diarrhoea is most dangerous?
   A. Potassium depletion
   B. Anorexia
   C. Base-deficit acidosis
   D. Fever
   E. Hypovolaemia

3. which of the following are features of hypertonic dehydration?
   (There may be more than one correct answer.)
   A. Extreme thirst
   B. Serum sodium concentration of 140mmol/liter
   C. Very irritable child
   D. Serum potassium concentration of 3.8 mmol/ liter
   F. Lethargic child

4. Kadija, who is a 2 years old child is brought to you because she has had a diarrhea for three days. When you examine her you note that she is irritable and fussy and that her skin pinch goes back rather slowly. Other findings most consistent with her degree of dehydration would be:

A. Normal eyes, tears are present when she cries, the mouth and tongue are moist

B. The eyes are very sunken, tears are absent when she cries, and she is unable to drink

C. The eyes are some what sunken, she drinks water eagerly from a cup, the mouth and the tongue are (rather dry)

D. She has fever of $38.5c^0$, her stool contains some blood, she is not interested in drinking water.

5 . A mother brings her 2 year old daughter Kadja to you because she has had diarrhoea for two days. When you examine her you note that she is irritable and fussy, her eyes are not sunken, she has tears when she cries, her mouth is somewhat dry, and she takes water eagerly from a cup, her skin pinch goes back rather slowly. She does not appear to be under nourished. Based on these findings, what conclusions would you draw about Kedija's condition and how she should be treated. (There may be more than one correct answer)

A. Kadija has severe dehydration

B. Kadija has no signs of dehydration

C. Kadija has some dehydration

D. Kadija should be treated according to treatment plan A

E. All, are correct

6. Which of the following is not the sign of severe dehydration?

A. Low urine out put

B. Lethargy

C. Irritability

D. Drinking eagerly

E. Hypotension

7. List the different types of diarrhea by pathogenesis

   A .....

   B. .....

   C. .....

   D. .....

8. What is the possible diagnosis in child with bloody diarrhea, tenesmus, fever, abdominal cramp and there were members of his family with this manifestation in the last 4 days?

   A. Giardiasis

   B. Amebiasis

   C. Bacillary Dysentery

   D. Food poisoning

   E. A &C

9. Could there be any possibility of occurrence of an outbreak in this family's village?

   A .....

   B. .....

10. What could be the complication of such kinds of diarrhea?

A. Sodium, chloride, potassium and bicarbonate

B. Sodium, Potassium, zinc and Iron

C. Sodium, phosphate, calcium and magnesium

D. Iron, Sodium, Zinc and calcium.

2. Reasons why diarrhea may lead to malnutrition are:

A. Loss of appetite

B. Damage to small bowel mucous, resulting in malabsorption

C. Food withdrawal

D. All of the above

3. The oral rehydration salts (ORS) solution recommended by WHO and UNICEF contains:

A. Sucrose, water, sodiumchloride, organic flavour and potassium chloride

B. Glucose, water, sodium chloride and sodium bicarbonate.

C. Glucose, water, sodium chloride, potassium chloride and trisodium citrate dehydrate

D. Glucose, water and sodium chloride.

4. One packet of ORS packaged by UNICEF should be mixed in:

A. An amount of water depending on the degree of dehydration

B. 500 ml of water.

C. 1000 ml of water

D. 1500 ml of water

5. Indications for intravenous therapy in the treatment of acute diarrhea are:

A. Some dehydration, fever, nausea, and vomiting.

B. Severe dehydration with shock, stupor or coma, persistent vomiting or paralytic illius.

C. Any dehydration with fever and pneumonia

D. None of the above

6. ORS (oral Rehydration salt) is:
   A. A physiological fluid for rehydration and maintenance body fluid and electrolyte in diarrhea
   B. A food during diarrhoea
   C. Indicated only in diarrhea with fever and tenesmus
   D. Useful only in very mild cases
   E. A replacement for IV fluid whenever there is severe dehydration.

7. Oral fluid can be administered by:
   A. Cup and spoon
   B. Catheter
   C. Nasogastric tube(NGT)
   D. A and C

8. The correct home treatment of diarrhea is:
   As soon as diarrhea starts,
   A. Give more fluid than usual, discontinue feeding and look for signs of starts,

10. Three key signs of dehydration in children are:
(there are more than one answer)
    A. Increased crying spells.
    B. Increased thirst, eagerness to drink
    C. Restless, irritable condition
    D. Sunken eyes.
    E. Reduced ability of skin to retract.

2.1.2.3 For Laboratory Technicians

Directions: *Choose the letter of the answer that best suits*

1. One of the following is not included under macroscopic examination of stool specimen?
    A. Consistency of stool
    B. Elemental composition of stool
    C. Ova and cyst stages of parasites in the stool
    D. Color and odor of stool specimen
    E. None of the above

2. In acute diarrhoeal disease the usual stage of E. histolytica and G.lamblia that is found in diarrheic stool sample
    A. Cyst
    B. Trophozoites
    C. Larvae
    D. A and B
    E. None of the above

3. In macroscopic and chemical tests examination of amoebic dysentery, the stool appears to be
    A. Acidic pH
    B. Bloody
    C. Mucoid
    D. Offensive odor
    E. All of the above

4. Stool specimen for the investigation of diarrhoeal disease can be collected in
   A. Cary-Blair transport medium
   B. A waxed car board box
   C. Plastic box
   D. A glass Jar designed for stool collection
   E. All of the above

5. Diarrhoeal stool specimen should be
   A. Examined immediately
   B. Examined macroscopically only
   C. Referred to specialized laboratories for culture and biochemical tests
   D. Preserved in suitable medium
   E. All of the above

6. Usually methylene blue feacal smear preparation helps to investigate
   A. Fecal leukocytes
   B. Stages of parasites
   C. Bacteria
   D. Viruses
   E. All of the above

7. Modified Ziehl-Nelsen staining of fecal smear helps to detect and identify stages of
   A. T.trichiura
   B. E.vermicularis
   C. Cryptosporidium
   D. histolytica
   E. None of the above

8. Basic fuchsin fecal smear preparation mainly helps to investigate
   A. Campylobacters
   B. Hookworms
   C. Rotaviruses

D. G.lamblia

E. None of the above

2.1.2.4 For Sanitarians

Directions: *Give short answers for the questions stated below.*

1. What are the causative agents of diarrhoea that are related to viral agents?
2. If feces is deposited in the open area how would it reach our food source?
3. What are the common ways of diarrhoeal transmission?
4. Even if individuals are supplied with clean water it may be contaminated in the home. How would that happen?
5. Mention three transmission routes of diarrhea and describe how the disease is transmitted through that route?
6. How is food contaminated by diarrhoea causing germs :
   - At the source
   - During preparation
   - During storage
7. In the Ethiopian context what are the hazards in the living environment that promote the transmission of diarrhea?
8. What personal hygiene practice plays a major role in preventing the transmission of diarrhoeal disease?
9. What two methods do you know in giving health education ?
10. What are the important practices one should follow after constructing a latrine?
11. Where do you site a pit latrine? Why?
12. What hygienic behavior contribute to diarrhoeal disease transmission when drawing water from water storage

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E. A & b only

5. Suppose there are over 10 children who developed bloody diarrhea with fever and tenesmus in your surrounding over a period of 5 days, what will you do first?
   A. Give contrimoxazole to all of them
   B. Give ORS to all of them
   C. Alert the health center team and try to work out the cause and means of prevention
   D. B &C
   E. None

6. What factors exposed Kedija to diarrhoeal disease?
   A. Poor feeding
   B. Poor environmental hygiene
   C. Harmful traditional practices
   D. Economic problems
   E. All are correct

7. From the story in the core module unit 2, section 2.4, what would you have done to prevent to development of diarrhoeal disease?
   A. _____
   B. _____
   C. _____
   D. _____
   E. _____

2.2 Significance and Brief Description of the Problem

Diarrhoeal diseases are one of the top (major) leading causes of under five morbidity, mortality and under nutrition in developing countries. In African countries including Ethiopia, each child on average suffers from five episodes of diarrhoea per year while the two-weeks prevalence ranges from 10 to 40% in different parts of Ethiopia.

Diarrhoeal diseases have persistently been the first or the second causes of visits to health units in the country. In general, diarrhoea alone contributes to 19% of the under five deaths globally, while 22.5% of hospitalization and up to 20% of all outpatient visits in children. Diarrhoeal death ratio, i.e number of deaths of children due to diarrhea over the total number of deaths of children due to any cause is 46%.

The dangers of diarrhoea are related to dehydration and mainutrition while, dysentery is another important causes of death due to the fatal complications associated with it. The main objectives of control of diarrhoeal diseases (CDD) in Ethiopia are reduction of morbidity and mortality due to diarrhoeal disease in children under 5 years of age. The control and prevention can be achieved through effective curative, preventive, promotive and rehabilitative services. These services can be rendered effectively by a properly trained health center team-which is the whole theme of this module.

2.3 Learning Objectives

2.3.1 General Objectives:-

The purpose of this module is to equip the students (trainees) with the appropriate knowledge, attitude and skills required to correctly identify and effectively manage diarrhoeal cases as well as prevent and control diarrheal diseases.

2.3.2 Specific Instructional Objectives:-

For correct identification and effective management of diarrhoeal cases, as well as prevention and control of diarrhoeal diseases, students are expected to achieve the following specific objectives:-

1. Identify and define the types of diarrhoea
2. Enumerate the causes and risk factors of diarrhoea
3. Describe the magnitude and contribution of diarrhoea to the overall child health problems both locally and throughout the country

4. Describe the pathogenesis of diarrhea
5. Identify and describe the clinical manifestations of diarrhea and its

The village where Kadija was born and live is isolated. Moreover, it has no safe water supply, health facility, school nor convenient communication. The family lives in a one roomed traditional house together with other animal such as chicken, goats and cows. The dirty floor, the animal waste, and poor ventilation makes the living environment unsanitary.

Since Kedija's mother and father are farmers, they spend most of their time in the field, hence, Kadija and the other kids have never been taken care of by the mother. The elder daughter who is a small girl herself is responsible to look after the little ones.

The family has a small plot of land to farm. If they have a good harvest they may be able to eat one meal a day for some months but not for the whole year. It is during the rainy season, and when food is scarce among other things that Kadija developed bloody diarrhea with fever, tenesmus, abdominal cramp and vomiting .

The family had experienced many unhappy days in the past. Children were getting sick very frequently, Fatuma herself has never been a healthy mother. She has no rest even when she is pregnant as she has to help her husband in the farm. In this time of the year (rainy season), many farm activities take place. Kadija's diarrhoea, although not a new phenomenon in the family is another family burden.

Kedija's diarrhoea worried the mother, nevertheless they did not do any thing to alleviate her problem the first day. The

him to visit a traditional healer some distance from their village. He went there in the dark and found the traditional healer who has given him a small quantity of plant juice, Kedija was forced to drink it, but she threw most of it away.

The third day, a woman in the neighborhood who had the same bad experience in the past advised the family to take Kadija to the health center which was found at a distance from their village. Since Ato Ahmed had no money to pay for transport he had to walk to the health center. He started walking very early carrying Kadija in both his arms, his wife following him. The whole trip, Kadija never moved or made any sound. She was very weak. They arrived at the health center around 10:00 a.m. but the guard told them that they are too late. He informed them that they have to return very early the following day. Although they begged and pleaded it was to no avail. They told the guard “she won’t survive the night, please let us in “. He ignored them. So, Fatuma and Ato Ahmed with Kadija in his arms had to sit out

2.6 Epidemiology of Diarrhoeal Disease

2.6.1. Magnitude and Severity of The Problem

Diarrhoeal diseases are a leading cause of childhood morbidity and mortality in developing countries where an estimated five million deaths occur each year in children under 5 years of age. Children under 5 years of age may experience as many as 5 episode of diarrhoea per year, although a rate of 3-4 episode is more common. Most of the diarrhoeal episode occurs in children in the first 2 years of life. In some areas young children spend 15 -20% of their time with a diarrhoeal illness. Diarrhoeal episodes result in approximately 5 million deaths each year. About 80% of these deaths occur in children in the first 2 years of life. Most diarrhoeal illnesses are acute, lasting not. more than 2 weeks; however, about 5% of these illnesses last longer. These persistent diarrhoea cases require care that is expensive and often ineffective, and they may cause as many as 25% of all diarrhoeal associated deaths.

In addition to causing high rates of morbidity and mortality, diarrhoeal diseases are one of the main causes of childhood malnutrition. Also as many as 30% of pediatric beds in developing countries are occupied with children with diarrhoeal diseases. As a result, diarrhoeal diseases levy a very heavy burden on health facilities and national health budgets .

2.6.2 Mode of Transmission and Risk Factor

2.6.2.1 Mode of Transmission

Usually the indirect mode of transmission through vehicles like water and food is common. Sometimes, direct transmission takes place as in the case of auto infection where poor personal hygiene, especially failure to wash hands after defecation, is responsible. Examples of behaviors that help enteric pathogens to spread are: preparing food with hands that have been soiled during defection without washing; or

Failing to dispose feces off (especially infant feces) hygienically. It is often believed that infant feces is harmless, whereas it may actually contain large numbers of infectious viruses or bacteria. Animal feces also can transmit enteric infections to humans.

2.6.2.2.1.2 Host Factors That Increase Susceptibility To Diarrhea (biological factors)

Several host factors are associated with increased incidence, severity, or duration of diarrhea. They include:

Malnutrition : the severity and duration is increased in under nourished children, especially those with severe malnutrition.

Failure to get children immunized for measles:- diarrhea and dysentery are most frequent or severe in children with measles or who have had measles in the previous four weeks. This presumably results from immunological impairment caused by measles. Its association with diarrhea accounted for one-third or more of diarrhea related deaths in young children. Measles predisposes to diarrhea by:

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human or animal feces when the infant starts to crawl. Most enteric pathogens stimulate at least partial immunity against repeated infection or illness, which helps to explain the declining incidence of disease in older children and adults.

2.6.2.2.2 Environmental Factors

Seasonality:- Distinct seasonal patterns of diarrhea occur in many geographical areas. In temperate climates, bacterial diarrheas occur more frequently during the warm season, whereas viral diarrheas, particularly diseases caused by rotavirus, peak during the winter. In tropical areas, rotavirus diarrhea occurs throughout the year, increasing the frequency during drier, cool months, whereas bacterial diarrhea follows the same seasonal pattern as that of acute watery diarrhea.

Inadequate food intake due to different reasons

Poverty and poor living conditions

2.7.1 Pathogenesis

Whichever pathogen is the cause of diarrhea, the mechanism of its development can be grouped into the following parts:-

1. Secretory Diarrhea

This occurs when absorption of sodium in the villi is impaired while the secretion of chloride in the crypt cells continues to increase . This situation occurs in infection with cholera and Enterotoxogenic E. coli (ETEC), food poisoning etc. in which case the toxins from the microorganisms stimulate secretion of fluid.

2. Invasive Diarrhea

This occurs when there is disruption of the intestinal mucosal cells as a result of invasion by bacteria, protozoa, or parasites (see causative agents)

3. Motility Diarrhea

This occurs due to increased motility (peristalytic action) of the gastrointestinal tract (GIT) resulting in a decrease in the transit time of food or drink across the GIT. This gives less chance for the contents to be absorbed, example thyrotoxicosis , Hyperkalemia and use of purgatives.

4. Osmotic Diarrhea

This occurs due to decreased absorption of osmotically active substance which draws fluid in the GIT with it by osmosis and makes the stool to be loose or watery, example Lactose intolerance and Laxatives .

5. Malabsorption Syndrome

This occurs because of decreased absorption of nutrients as a result of abnormality in the absorptive surface area (example sprue, gluntein induced entheropathy, seatorhea, enzyme deficiencies, etc…)

2.8 Clinical Features(Signs and Symptoms)

2.8.1. Symptoms :

Symptoms	*Signs*
Passage of loose stool Increased frequency of passage of stool Loose, watery consistency of stool Low urine out put Increased volume of stool Vomiting	Sunken eye ball Dry tongue and ducal mucosae Poor skin turgor Low blood pressure Lethargy Weight loss

2.8.2. Using Clinical Signs to Determine the Degree of Dehydration

As indicated in table 1 below, the degree of dehydration dictates as to which treatment plan one should follow based on the signs of dehydration.

Table 1. Major Signs and Grades of Dehydration

Complications :-

- Dehydration

  This is the most common acute complication which accounts for 70% of deaths due to diarrhea
- Malnutrition
- Electrolyte imbalance

Key sign *

For two or more of the above signs plus one key sign (*) indicates severe dehydration and requires urgent treatment ,according to treatment plan C.

(* key sign for some dehydration and ** key sign for severe dehydration)

Poor skin Turgor Indicates Severe Dehydration

Figure 1. Skin Pinch assessment to detect dehydration

2.9 Diagnosis

2.9.1 Clinical Diagnosis

Mainly from medical history and physical examination (see page 28)

2.9.2 Laboratory Diagnosis

Macroscopic and microscopic examination of stool is sufficient for starting treatment of diarrhoeal disease. A well equipped laboratory is required for culture sensitivity tests and electrolyte determination, but at a primary health care unit(PHCU) level basic laboratory service like stool examination is adequate

2.10 Case Management (see table one page 30)

1. Replace fluid & electrolytes - irrespective of the etiology (give ORS or food based ORT)
2. Continue feeding give increased fluid during diarrhea
3. Anti-microbial and anti-parasites are not required except for Diarrhea due to cholera, severe bacillary dysentery and parasites(for the fluid regimen and the dose and choice of antibiotics, refer to the satellite module for health officers in unit 2, section 2.10).

Giving ORS is Life Saver to a Child With Diarrhea

Figure: 2 Mother giving ORS with spoon

Figure: 3 Mother giving ORS with cup

2.11 Control and Prevention

Diarrhoeal disease occurrence is closely connected with individual and community hygienic practice and thus hygiene education coupled with environmental and water sanitation is the major preventive strategy. The objectives of health education should be to enhance proper case finding and treatment both and in the home as well as at health institution level, and to promote and strengthen the preventive practices related to diarrhoeal diseases.

The effectiveness, feasibility and cost of each of the many possible interventions for the reduction of diarrhea morbidity and mortality in children under 5 years of age was assessed by WHO/CDD supported researchers. Among the interventions, the following seven could markedly reduce the rates of both morbidity and mortality due to diarrhoeal diseases in young children.

1. ***Breast Feeding:*** during the first 4-6 months infants should exclusively breast fed. This means the baby should receive breast-milk and no other fluids such as water, juice or. formula. During the first six months of life, the risk of having severe of fatal diarrhea is 30 times greater for infants who are not breasted than for infants who are exclusively breasted. During the second six months of life infants should be partially breastfed. Partial breast feeding reduces the risk of severe diarrhea and diarrhoeal death.

2. ***Improved Weaning Practices:*** when the child is about 4-6 months old breast feeding should continue but the child should be introduced to a few soft, mashed foods twice per day. From one year of age continue breast feeding as desired and give all foods, suitably prepared, 4 to 6 times per day. Suitable

Breast Feeding is essential for Prevention of Diarrhoea

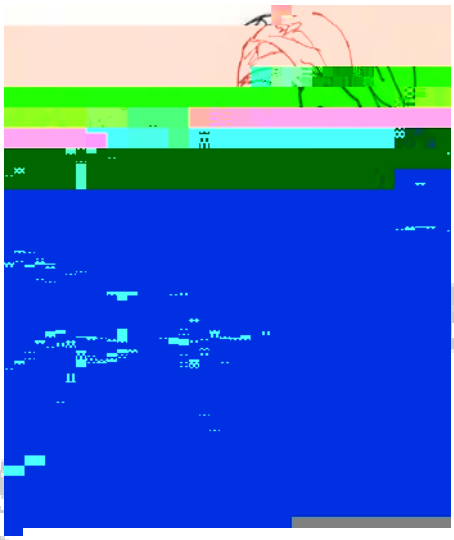

Figure:4 Mother Breast Feeding

3. ***Use of Plenty of Clean Water:*** Using plenty of clean water helps protect families from diarrhea. Families can reduce their risk of diarrhea by using the cleanest available water and protecting it from contamination, at the source and in the home.

4. ***Hand Washing:*** Good hand washing means use of soap (or local substitute), use of plenty of water and careful cleaning of all parts of the hands. (all family members should wash their hands well).

- Á After cleaning child who has defecated
- Á After defecation
- Á After performing and cleaning work
- Á Before preparing food
- Á Before eating
- Á Before feeding a child

Proper Hand Washing Essential for Prevention of Diarrhoea

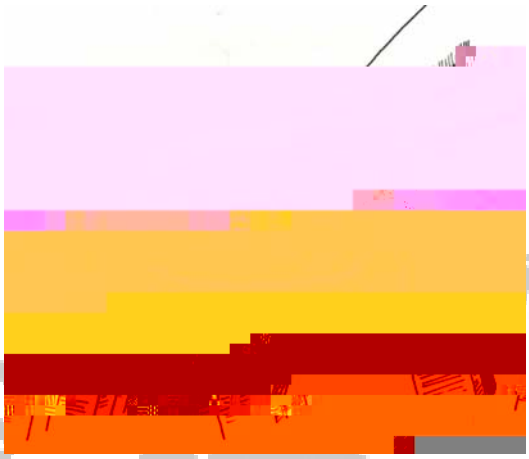

Figure:5 Proper Hand Washing

5. ***Use of Latrines:*** Diarrhoeal diseases are faeco-oral in transmission. Therefore, disposing of faeces more safely reduces the spread of diarrhea. Latrine ownership and use of latrine are associated with reduced risk of diarrhea.

6. ***Proper Disposal of the Stools of Young Children:*** Hygienic disposal of the faeces of young children is important. These stools are particularly dangerous because they transmit diseases to other children and parents.

7. ***Measles Immunization:*** In preventing measles, measles immunization also prevents the diarrhea that often accompanies or follows it. Diarrhea which is associated with measles is particularly severe, is often dysentery, and is more likely to lead to death than most diarrhoea in children. Up to 10% of children with measles and diarrhoea die.

Since diarrhea due to infection (the commonest type) is transmitted by fecal-oral route through food and drink, it may be generally classified as a disease of poor health promoting behavior (especially poor sanitation). This indicates that the disease, can be prevented successfully through a proper sanitation.

This is summarized by the " 5F" diagram (as it involve: Feces, Food/Fluid , Flies, fomites (utensils) and Finger) below.

The Example of '5F' Diagram Indicates That

1. Human waste exposed to flies and food
2. Human waste contaminating water sources and food
3. Contaminated water, contaminates food or directly a healthy person.
4. Flies that have an access to human waste contaminate food.
5. Poor hygienic practice contaminates the cooking and eating utensils.
6. Flies could contaminate water and fomites
7. Flies could contaminate food
8. Contaminated food could be a health hazard for a healthy person.
9. The overall result will be debility or death

Barriers

In order to stop the transmission of diarrhea from the source, in this case the human waste, there could be two barriers:

1. Physical
2. Behavioral

1. Physical

Feces can be disposed by using an excreta disposal system. This discourages the breeding of flies and nuisance conditions created by the feces. It protects the soil from contamination and ultimately surface or ground water pollution by filth and pathogens (see barrier 1)

2. Behavioral

If barrier 1 is not available individuals and communities should get a safe water supply from a protected water source so that food preparation and drinking water will at least be safe(see barrier 2). Even if there is excreta disposal system (latrine) unless people use it persistently and wash their hands with soap after they come out of the latrine, it may be useless. A mother, or

caretaker who does not wash her hands after visiting toilet may contaminate food, food utensils and

other food contact surface (Barrier 3). As one can see from the above diagram, diarrhea prevention strategy should include all the five environmental domains, which are:-

a. Proper disposal of human feces
b. Protecting sources of water
c. Water and personal hygiene
d. Food protection and hygiene
e. Domestic and environmental hygiene

2.12 Learning Activities (Case Study) Continued

1. Read case study - the story of Kedija to start discussion on the problems faced by a family such as Kadija's.
   - Â What caused Kadija's sickness
   - Â What were the factors that exposed her to the infection
   - Â Can you enumerate the physical, social, and biological factors that contributed to Kadija's death?
   - Â What should have been performed by the family immediately after Kadija was sick?
   - Â What should people in Kadija's village do to save their children from sickness and death?
   - Â What would be the government's share to alleviate such common problem?
2. Cut all the boxes in the chart that shows transmission routes of diarrhoeal diseases and barriers, and ask groups to reassemble them again.
3. Use also the disease transmission posters for discussion of how that transmission in the poster actually happened.
4. What determines behaviors that promote diarrhoeal disease?

UNIT THREE

SATELLITE MODULES

UNIT 3.1

SATELLITE MODULE FOR HEALTH OFFICERS

UNIT:1 INTRODUCTION

1.1 Purpose Of The Module

The ultimate purpose of this training module is to produce Competent Health Officers who can correctly identify and effectively manage diarrhoeal cases both in clinical and community settings.

1.2 Direction For Using The Satellite Module

This satellite module can be used in the basic training of Health Center team particularly health officers who are in the training and service programs. In order to make maximum use of the satellite module, the health officer should follow the following directions.

1.2.1 Do the pretest for satellite module of Health Officers in section 2.1.2.1 and unit two of the core module

1.2.2 Check or read the core module very thoroughly

1.2.3 Read the case study and try to answer questions pertinent to it

1.2.4 Use listed references and suggested reading materials to supplement your understanding of the problem.

1.2.5 For total and comprehensive understanding of the causes (Ethnology/Pathogenesis), Epidemiology and prevention of diarrheal disease the health officer students are advised to refer to the core module.

1.2.6 Evaluate yourself by doing post-test in section 2.1, 2.1 unit 2 of the core module and compare your score by referring to the key given in unit seven section 7.2.1.

UNIT:2 SATELLITE MODULE FOR HEALTH OFFICERS

2.1. Pre and Post Test for The Satellite Module of Health Officers

See the pre and post tests for the health officers in the core module under unit 2, section 2.1.2.1

2.2. Significance and Brief Description of The Problem

See the part under unit 2 section 2.2 in the core module

2.3 Learning Objectives

For effective case management of diarrhoeal disease, the health officer student will be able to do the following at the end of the training.

1. Demonstrate the process of assessing a child with diarrhea
2. identify and describe the clinical manifestations complication in a child with diarrheal disease
3. List the diagnostic methods and procedures for a case with diarrhea
4. Describe the principles and methods of treatment of diarrheal disease
5. Select the appropriate treatment plan for a case of diarrhea
6. Identify and manage or refer timely, a case of diarrheal disease when needed
7. Demonstrate the appropriate management of cases of diarrheal disease
8. Describe the limitations and situation were antibiotics are use in the management of diarrheal disease

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Complications of Diarrhea

Acute

Electrolyte imbalance(sodium, potassium depletion)

Dehydration, Hypovolemia, shock and Acidosis

In case of Bacillary dysentery

Toxic mega colon

Hemolytic uremic syndrome

Reactive arthritis

Chronic

Malnutrition

2.9 Diagnosis of Diarrhoeal Diseases

The clinical work up of diarrhoeal diseases is mainly based on four assessment methods, which do contribute to accurate diagnosis and management. These are:

Detailed and pertinent history

Meticulous physical examination

Epidemiological considerations

Laboratory findings

The Following Tables Summarize The Differential Diagnosis for Etiology of Diarrhoeal Diseases, Clinical, Epidemiological and Laboratory Features

Differential Diagnosis				
	Viral	**Travelers**	**Staphylococcal Food poisoning**	**Salmonella Food Poisoning**
a. Epidemiology	Often occurs in epidemics. Most common cause of non-infantile diarrhea	Occurs in newcomers to an area	Occurs 1-6 hours after eating contaminated food	Occurs 8-48 hours after eating contaminated food.
b. Onsets	Abrupt	Abrupt	Explosive	Abrupt
c. Systemic signs	Fever and chilliness in children. No or mild fever in adults	No fever	No fever Marked prostration	Fever 39-40 Chill often present
d. Abdominal signs	Mild to moderate cramping	Mild to moderates cramping	Moderate to severe cramping	Crampy abdominal pain. There may be localized pain with rebound tenderness.
e. Vomiting	Common in children. Rare after first day in adults	Infrequent	Always present Severe and Continues It may contain blood	Usually present
f. Diarrhea	May be profuse and watery. Up to 20x day stools loose and watery	May be profuse		

2. DYSENTERIES

	Shigellosis	Amebiasis	Severe	Schistosomiasis	Malaria	Relapsing Fever
a. Epidemio-logy	Often other cases in family or village usually 48 hours or more	_____	_____	Patient comes from endemic area	Patient comes from endemic area	Occurs during "Season"
b. Onset	Abrupt	Gradual	Abrupt	Gradual	Abrupt	Abrupt
c. Systemic signs	Fever 40-41 chill often present. Severe dehydration may be present patient looks "toxic".	No or mild fever. No dehydration. Patient looks well	Fever 40-41 Severe dehydration. Patient looks "toxic"	Fever may or may not be present. May have cough, urticaria and myalgia. Portal hypertension may be	Classic paroxysms usually present. However, fever may be absent	Cough, nose bleeding petacchiae Jaundice may be present
d. Abdominal signs	Crampy abdominal pain, generalized tenderness, most severe over lower quadrants,	Liver enlarged and tender in 25%. Mild abdominal .				

3.9 Case Management

GIVE EXTRA FLUID FOR DIARRHOEA AND CONTINUE FEEDING

Á ***Plan A: Treat Diarrhoea at Home***

Counsel the mother on the 3 Rules of Home Treatment

Give Extra Fluid

Continue Feeding

When to Return

1. Give extra Fluid (as much as the child will take)

Tell the mother:

Breastfeed frequently and for longer at each feed

If the child is exclusively breastfed, give ORS/cereal based ORT or clean water in addition to breast milk.

If the child is not exclusively breastfed, give one or more of the following : ORS/, food-based fluids (such as soup, gruel(Atmit), rice water and yogurt drinks), or clean water.

It is especially important to give ORS/ Cereal Based ORT at home when;

Á The child has been treated with plan B or plan C during this visit

Á The child cannot return to a clinic if the diarrhoea gets worse.

Teach the mother how to mix and give ORS. Give the mother

2. **Continue feeding (**With home made cereal based foods like "Atmit", "Genfo" , Juice especially made of pineapple.)

3. **When to return**

When child develops fever

If the child is getting weaker

If the diarrhea does not decrease within three days

Á ***Plan B Treat Some Dehydration with ORS***

Give in clinic recommended amount of ORS over 4 hours period

Á Determine amount of ORS to give during first 4 hours

Age	Up to 4 months	4 month up to 12 months	12 months up to 2 years	2 years up to 5 years
Weight	<6 kg	6 -10 kg	10 - 12 kg	12 - 19 kg
In ml	200-400	400 – 700	700 – 900	900 – 1400

**Use the child's age only when you do not know the weight. The approximate mount of ORS required (in ml) can also be calculated by multiplying the child's weight (in kg) times 75.*

Á If the child wants more ORS than shown, give more.

Á For infants under 6 month who are not breastfed, also give 100-200 ml clean water during this period.

Á **Show the mother how to give ORS solution**

Á Give frequent small sips from a cup.

Á If the child vomits, wait 10 minutes. Then continue, but more slowly

Á Continue breastfeeding whenever the child wants

Á **After 4 Hours**

Á Reassess the child and classify the child for dehydration

Á Select the appropriate plan to continue treatment

Á Begin feeding the child in clinic

Á If the mother must leave before completing treatment

- Á Show her how to prepare ORS and food based ORT such as 'Atmit" at home
- Á Show her how much ORS to give to finish 4-hours treatment at home
- Á Give her enough ORS packets to complete dehydration. Also give her 2 packets as recommended in Plan A
- Á Explain the 3 rules of Home Treatment

1. **Give extra fluid**
2. **Continue feeding**
3. **When to return**

Á *Plan C Treat Severe Dehydration Quickly*

Dehydration therapy using IV fluids or NG tube is recommended only for children who have severe dehydration.

When giving IV therapy give large quantity of fluid quickly to replace the bodies large fluid loss.

If the child can drink give ORS or Food based ORT by mouth until the drip is running.

Then give

- 30 ml / kg within 60 minutes for infant
- 30 ml / kg within 30 minutes for children
- 70 ml / kg more slowly to complete rehydration

Reassess the child every 1-2 hours. If hydration status is not improving, give the IV drip more rapidly.

Also give ORS (about 5 ml /kg /hour) or food base ORT as soon as the child

3.10 Prevention

Refer to section 2.11 in the unit 2 of the core module

3.11 Post Test

See the pretest in the core module pertaining to health officers

4.0 Role and Task Analysis

Refer to unit 4 of the core module for the tasks expected of you.

5.0 Glossary and Abbreviations

Refer to unit 5 of the core module

6.0 References

Refer to unit 6 of the core module

7.0 Annexes

Refer to unit 7 of the core module for answer keys and other materials

UNIT 3.2

SATELLITE MODULE FOR PUBLIC HEALTH NURSES

UNIT:1 INTRODUCTION

Any person who experiences diarrhea for more than a day or two is urged to seek medical advice. The symptom should not be ignored, since it may be an early manifestation of a serious condition.

1.1 Directions For Using The Satellite Module

In order to effectively utilize this satellite module the public health nurse should follow the following direction

- Á Do pretest in section 2.1.2, in the unit 2 of the core module
- Á Read or refer the core module critically
- Á

2.3. Learning objectives

2.4 Learning Activities : Case Study

Read Kedija's story very thoroughly so that you will be able to discuss questions that are posed in section 2.12 of this module

2.5 Definition

Refer to the core module unit 2, section 2.5

2.6 Epidemiology

See the core module unit 2, section 2.6

2.7 Etiology and Pathogenesis

See the core module unit 2, section 2.7

2.8 Clinical Features (Symptoms and Signs)

See the core module, unit 2, and section 2.8.

2.9 Diagnosis

See the core module unit 2, section 2.9

2.10 Case management

The best way to learn about dehydration and how patients respond is to check a dehydrated patient repeatedly during the entire four hours or longer course of therapy. The public health nurse (PHN) needs to know the signs and symptoms of dehydration very well. Try to see as many dehydrated patients as possible to learn how the signs can appear in different patients. Observe the different possible methods for administering rehydration solutions in use and administer the solution at the appropriate rate.

Classify Diarrhea

There are three possible classification of dehydration in a child with diarrhea

- No dehydration
- Some dehydration
- Severe dehydration

Nursing Management of Diarrhea

To replace water and salts lost in diarrhea select one of the following three treatment plans

1. Plan A-to treat diarrhea at home
2. Plan B-to treat some dehydration at the health facility with ORS
3. Plan C-to treat severe dehydration quickly with IV or NG rehydration

The Role Of PHN In Management Of Diarrhea At Home (Treatment Plan A)

Advise the mother to:

* Give extra fluid

Breast-feed more frequently and longer time

Offer ORS or clean water

If not exclusively breast-fed advice to give one of the following

ORS solution

Food based fluids (Gruel made out of available cereals)

Clean water

Teach the mother how to mix and give ORS

* Steps for making ORS solution:

Wash your hands with soap and water

Pour all the powder from one packet in clean container

Measure 1 litter of clean water

Pour the water into the container

Explain to the mother that she should mix fresh ORS or food based ORT each day in a clean container, keep the container covered and through away any solution remaining from the day before.

Instruct the mother to:

Give frequent small sips from a cup or spoon

Wait 10 minutes before giving more fluid if the child vomits

Resume giving the fluid, but more slowly

Continue giving extra fluid until the diarrhea stops.

Give only ORS solution or Food based ORT and plain water in addition to breasts milk. if the child is under 6 months old and taking only breast milk

Instruct the mother when to return

*passes many watery stools

Vomit is repeatedly

Is very thirsty

Eats or drinks poorly

Has fever

Has blood in stool

The responsibility of PHN in managing some dehydration at ORT Corner with ORS: (Treatment plan B)

An ORT corner is an area in a health facility available for oral rehydration therapy (ORT). This area is needed, because mothers and their children who need ORS solution will have to stay at the clinic for several hours. When there are dehydrated patients, this conveniently located and adequately equipped ORT corner will help the staff to manage the patients easily.

Where to Locate ORT Corner:

The PHN is Responsible to Equip The ORT Corner With The Following Facilities And Supplies:

Table for mixing ORS solution and holding supplies.

Shelves to hold supplies

Bench or chair with a back for mother to sit comfortably while holding the child.

Small table for cup of ORS solution

ORS packets

Bottles that will hold the correct amount of water for mixing the ORS solution.

Cups

Spoons

Droppers (for small infants)

Soap (for hand washing)

Waste basket

Food available (so those children may be offered food or eats at regular meal times)

To determine the amount of ORS to be given during the first 4 hours use the child's age

Up to 4 months = 200-400ml

4-12 months = 400-700ml

12 months-2years =700-800ml

5 years = 900-1400ml

If the child wants more ORS, give more

For infants less than 6 months that are not breast-fed, also give 100-200ml of clean water during this period.

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When breast-feeding is not possible, milk formulas must be given. It is better to give formulas with a cup and spoon than bottle.

Feeding babies milk from bottles is not good, because it is very difficult to keep bottles clean.

At four – six months all babies should start to have other foods other than milk or milk formulas soft smashed foods are best.

All foods should be fresh and prepared in a clean place using clean pots and utensils.

Cooked food should be eaten while still hot or well heated again before eating.

Uncooked food should be washed in clean water before eating.

See unit 4 of the core module for the tasks expected to you

2.14 Glossary and Abbreviation.

Refer to unit 5 of the core module

2.15 Bibliography.

Refer unit 6 of the core module

2.16 Annex.

Refer to unit 7 of the core module for answer keys and other materials

UNIT 3.3

SATELLITE MODULE FOR

MEDICAL LABORATORY TECHNICIANS

UNIT 1: INTRODUCTION

1.1 Purpose of The M1SSule

2.3 Learning Objectives

At the completion of this module and with appropriate experience in the laboratory you should have acquired the skills and competence that will enable you to:

- Describe the procedures of collecting, labeling and handling stool specimens
- Describe the appearance of stool specimen in some diarrhoeal Diseases
- Describe and demonstrate the laboratory procedures for routine microscopic examination of stool specimens with normal saline and iodine solution and when to refer stool specimens
- Describe and demonstrate how to prepare methylene blue fecal smear Preparation
- Describe and demonstrate how to prepare basic fuchsin fecal smear preparation
- Describe and demonstrate how to prepare modified Ziehl- Nelson staining of fecal smear
- Describe and draw the morphological features of some diarrhea causing agents
- Demonstrate proper recording system of results of stool examination

2.4 Learning Activities(Case Study)

Refer to kedija's story in the core module and discuss on the following questions in the class. The instructor can assist you.

1. How is stool specimen collected?
2. What could be the etiology of diarrhea?
3. What could you identify on visual inspection of the stool specimen?
4. What microscopic laboratory investigations could be done at the health center level?
5. What materials are required to carry out the investigations?
6. What should be reported in the laboratory request form**?**

2.5 Definition

Refer to the core module unit 2, section 2.5.

2.6 Epidemiology

Refer to the core module unit 2, section 2.6

2.7 Etiology and Pathogenesis

Refer to the core module unit 2, section 2.7

2.8 Laboratory Diagnosis

2.8.1 Collection and Handling of Stool Specimen

The accurate laboratory diagnosis and the reliability of the results of fecal specimen examinations will depend largely on the care taken in collecting and handling of the stool specimens. The following precautions should be taken into consideration while collecting and handling of stool specimens for examinations of diarrheal diseases.

morning (i.e. 2 or 3 hours later).

3. Never accept stools mixed with urine (e.g. in a pot or bedpan)
4. Never place the container with the stool specimen on the examination request form.

6. Referral of Stool Specimen For Examination.

When there are epidemic outbreaks of diarrhoeal disease and persistent diarrhea caused by etiologic agents, if there are no facilities in health center laboratories for the investigation, the specimen should be sent to the referral laboratories in a suitable medium or preservative for microscopic examination and culture. For each type of examination it is important to know which containers and preservatives to use, how much of the stool specimen to send, and how long the stool specimen will be kept.

Stool specimen for all cultures including vibrio cholera can be collected in Cary-Blair transport medium. It preserves for four weeks and a stool specimen for all cultures except vibrio cholera, can be preserved in buffered glycerol-saline in a bijout bottles for two weeks.

Stool specimen for parasite eggs, larvae and cysts can be handled in 30ml bottle containing 15ml of 10% formaldehyde solution. About 5ml of stool can be preserved and it keeps the stool almost indefinitely. The vegetative form of amoebae and Giardia can be preserved in 10ml tub e thiomersal, iodine and formldehyde solutions or polyvinly alcohol. The specimen can be kept indefinitly.

2.8.2. Laboratory Diagnosis Of Diarrhoeal Diseases

Usually the most important specimen for the diagnosis of acute diarrhoeal diseases is stool. In the case of persistent (chronic) and epidemic diarrheal diseases a well equipped laboratory is required for culture, sensitivities, serum electrolytes (Na, K, CO_2) and other testing, which are not typically available at the health center level. Macroscopic and microscopic examination of stool is sufficient for the health center based management of

diarrhoeal disease. Macroscopic and microscopic investigations are carried out in the diagnosis of diarrhoeal diseases.

1. Macroscopic Examination of Stool

Direct visual and chemical (pH) examinations of diarrhoeal stools may provide important clues as to the nature and causes of the disorder, it helps to know:-

1. Presence of adult worms in stool -- *Ascaris lumbricoides, E.vermicularis*, segments of *Taenia.*
2. Consistency (degree of moisture) of stool -- Hard, formed, semiformal, soft, mushy, loose, Diarrheic, watery,
3. Gross elements in the stool-- Fibers, mucus, blood, pus, etc.
4. Color of the stool-- Black, Darkbrown, Brown, Green, Yellow, etc.
5. Pathologic odor of the stool-- Offensive, non-offensive
6. PH (with litmus paper) of the stool-- Acidic (pH<7) or alkaline (pH>7)

Appearance of fecal specimens in some diarrhea disorders.

Possible cause	Appearance of stool
Rotaviruses Norwalk viruses Adenoviruses	Watery
Shigella dysenteriae Shigella flexineri	Watery, containing little mucus and blood In the early stage of infection. But consists entirely of pus and blood mixed with mucus in the later stage of infection. It is odorless, adheres to the container and alkaline pH with litmus paper unlike amoebic dysentery.

2. Microscopic Examination of Stool.

Routine microscopic examination of stool specimen with physiological saline and Dobell's iodine solution helps to detect and identify the stages of some parasitic organisms that may cause diarrheal diseases. Methylene blue smear preparation of fecal specimen helps to detect fecal mononuclear or polymorponuclear leukocytes (pus cells) that are mainly found in invasive diarrhea diseases caused by Shegella, Salmonella, Campylobacters. A Few leukocytes may be seen in amoebic dysentery and invasive strain of *Escherichia coli* (EIEC). Basic fuchsin smear preparation of stool specimens containing mucus, pus cells, or blood helps to detect Campylobacters.

2.8.3. Laboratory Procedures for Routine Microscopic Examination of Diarrhoeal Stool Specimens

2.8.3.1 Direct Microscopic Examination of Stool Specimen with Physiological Saline and Dobell's Iodine Solutions

Direct Microscopic Examination of stool specimens with Physiological saline and Dobell's Iodine solutions is used especially for the detection and identification of stages of intestinal parasites such as trophozoite and cyst of E.histolytica and G.lamblia, oocysts of I.belli, eggs of A,lumbricoides, T.trichiura, S.mansoni, and hookworms, and larvae of S.stercoralis. Also other intestinal parasites.

Materials Needed: Wooden applicator sticks, Microscopic slides, Cover slips, Dropping bottles containing physiological saline(0.85%w/v) and Dodell's , Iodine solutions, Microscope and Pasture pipette

Procedure:

1. Place a drop of physiological saline (0.85%w/v) in the center of the left half of the slide and place a drop of Dodell's Iodine solution in the center of the right half of the slide.
2. With an applicator stick, pick up a small portion of the feces (approximately) 2mg which is about the size of a match head) and add it the drop of saline.

Add a similar portion of stool sample to the drop of iodine.

3. Mix the feces with the drops to form suspensions.

4. Cover each drop with a cover slip by holding the cover slip at an angle of 30^0, touching the edge of the drop, and gently lowering the cover slip onto the slide so that air bubbles are not produced.

(not lobed) and polymorphnucear (a nucleus with two or more lobes) leukocytes.

2.8.3.3 Basic Fuchsin Fecal Smear Preparation

Basic fuchsin fecal smear preparation helps to detect Campylobacters in diarrhoeal stool specimens.

Materials Needed

1. 10g/l basic fuchsin
2. Slide
3. Microscope
4. Applicator stick
5. Pasture pipette
6. Sprit lamp
7. Distilled water
8. Immersion oil

Procedure:

1. Make a tin smear of the specimen on a slide
2. When dry , gently heat fix
3. Stain by covering the smear with 10g/l basic fuchsin for 10-20 seconds
4. Wash well with water
5. Examine the smear for Campylobacters using the 100X oil immersion objective.

2.8.3.4 Modified Ziehl-Neelsen Staining of Fecal Smear

Modified Ziehl-Neelsen Staining of fecal smear helps to detect oocysts of Cryptosporidium in acute watery or persistent diarrhea diseases.

Materials Needed

1. Carbol fuchsin stain
2. Malachite green stain
3. 1% acid alcohol
4. Slides
5. Cover slip
6. Microscope

Procedure:

1. Prepare a thin fecal smear on a slide
2. Air dry the smear
3. Fix the smear with methanol for 2-3 minutes
4. Stain the smear with cold carbol fuchsin for 5-10 minutes
5. Wash off then stain with clean tap water
6. Decolorize with 1% acid alcohol for 10-15 seconds until no more color floods from the Smear
7. Rinse off the decolorizer with clean tap water
8. Counter stain with 0.5% malachite green for 30 seconds
9. Wash off the stain with clean tap water
10. Stand the slide in a draining rack for the smear to dry
11. Examine the smear microscopically for oocysts using a lower power of magnification to detect the oocysts and the 100X oil immersion objective to identify them.

Morphology of some Diarrhea Causing Agents and other supportive investigations under the Microscope

Note:- Students are advised to refer atlas of bacteriology, parasitology and hematology for the detection and identification of the following objects in stool specimens.

Cryptosporidium

Oocyst

Size: 4-6 Nm in diameter

Shape: Round to oval

Color: Pink red, older oocysts stain pale

Campylobacters:- Are small, delicate, spiral curved, S-shaped, short spirochaetal forms.

Leukocytes in Stool:

Size :	10-20Nm
Shape:	rounded or slightly elongated, with an irregular outline
Content:	refractive, clear and granular cytoplasm

Entamoeba Histolytica

Trophozoite

25Nm by 20Nm
Irregular in shape
Finger like pseudopodia
Active directional amoeboid movement
Single nucleus with central karyosome and chromatin granules on the nuclear membrane contains ingested host's red blood cells

Cyst

10Nm by 6Nm
Oval
2-4 nuclei
Contains remains of axonemes and parabasal bodies
Thread like remains of flagella

Giardia Lamblia: -

Trophozoite

10-12Nm by 6Nm
Pear-shaped
Sucking disc
Eight flagella
Two nuclei
Parabasal bodies
Axonemes
Active falling leaf type of motility

Cyst

10Nm by 6Nm
Oval
2-4 nuclei
contains remains of axonemes & parabasal

Isospora Belli: -

Oocyst

20-33Nm by 10-19Nm

Oval

Usually immature

Mature Oocyst contain two

sporocyst each with four sporozoites

Schistosoma mansoni: -

Egg

150Nm by 60Nm

Oval

Pale, yellow-brown

Lateral spine

Contain fully

developed miracidium

Ascaris lumbricoides: -

Eggs

Fertilized:

60Nm by 40Nm

Oval or rounded

Yellow-brown

Has albumin coat

Unsegmented fertilized ovum

Decorticated:

No albuminous coat

Smooth shell

Colorless or pale-yellow

Unfertilized:

Darker

Elongated

Trichuris Trichiura: -

Egg **Barrel shape**

50Nm by 25Nm

Yellow-brown

Colorless protruding mucoid plug at each polar end

Unsegmented ovum

Hookworms: -

Egg Colorless

Thin eggshell

Oval

65Nm by 40Nm

Strongyloides Stercoralis: -

Larva Rhabditiform

200-300Nm by 15Nm

Actively motile

Rhabditiform bulbed esophagus

Short buccal cavity

Reporting and Recording of Results.

The following details should be reported

Age of the patient

Sex of the patient

Address of the patient

Result of laboratory investigation:

Macroscopic examinations

Microscopic examinations, if there are parasites, specify the scientific name of the parasites and stages, presence of leukocytes (pus cells) and other abnormalities.

2.9 Prevention and Control

Refer to section 2.11 in the unit 2 of the core module

2.10 Post Test

12. Glossary and Abbreviations

Refer to unit 5 of the core module

13. References

UNIT 3.4


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UNIT 1: INTRODUCTION

Diarrhoea is one of the killer diseases especially for underfive children in Ethiopia. According to the ministry of health, annual report 250,000 children of under five years of age die from disarrhoea.

The disease could be prevented and eliminated with successful sanitation program. Since diarrhoea is transmitted through a fecal/oral route, it may be generally classified as sanitation and behaviour related disease.

The main activities of the sanitarian with regard to diarrhoeal diseases are to apply primary prevention measures. Therefore, the role of the sanitarian concerning diarrhoeal disease is to work towards creating barriers so that disease causing organisms will have no chance to reach the healthy person.

1.1 Purpose and Use of the Module

This module can be used in the training of Sanitarians that are in actual training or those already in service for management of diarrheal diseases.

1.2 Directions for using the module

Do the pretest pertaining to your profession in section 2.1.2.4 of the core module

When using this satellite module, it would be profitable if the sanitarian follows the knowledge gained from the core module with his knowledge of the community he is working in.

The sanitarian should also read the core module thoroughly first and when referred in this module

Read the reference materials listed to supplement your understanding

In addition, the sanitarian could be successful in using this module if he/she works with other team members and intersectorally with other development workers (agriculture extension agents, development workers, home economists etc.)

Do the post test pertaining to your profession in section 2.1.2.4 of the core module and evaluate yourself by referring to the keys in unit 7 section 7.1.2.4

UNIT 2 : SATELLITE MODULE FOR SANITARIANS

2.1 Pretest and Post Test

Please refer to section 2.1.2.4 in the core module

2.1.2 Significance and Brief Description of the Problem

Please refer to section 2.2 in the core module

2.3 Learning Objectives

The objective of this module is to equip the sanitarian with the appropriate knowledge, attitude and skills required to effectively prevent diarrhoeal diseases and conduct hygiene education to targets for sustainable behavioral change. Therefore, at the end of this module, the sanitarians are expected to:-

Describe the routes of diarrhoeal disease transmission from waste matter and the logical barriers

Describe five environmental health domains that are important on prevention of diarrhoea.

Describe the importance of existing hygiene behaviours in the transmission of diarrhoeal diseases.

Describe the importance of identifying target audiences to effectively teach hygiene for positive behaviour change

2.4 Learning Activity (Case Study)

"The story of Kedija": Please refer to the story in section 4.1 in the core module and the exercise to section 2.9 in this unit.

2.5 Definition

Please refer to section 2.5 in the core module

2.6 Epidemiology:

Please refer to section 2.6 in the core module

2.7 Etiology and Pathogenesis;

Please refer to section 2.7 in the core module.

2.8 Primary Prevention and Control

The food we eat , the water we drink, and the utensil we use to eat and drink could be contaminated from diarrhoea causing organisms. (see Figure1. In the core module)

The sanitation measures that has to be taken so that diarrhoeal disease transmission

barrier) for diarrhoea. Isolation of feces can be effected by many types of latrine technologies such as the pit latrines. However, the most important thing to consider is not only to have latrines but:

The latrine should be sited away from water source sources (about 30 meters) and dwelling or kitchen (20 meters)

The latrine should guarantee privacy and safety

It should be cleanable and cleaned regularly

The latrine hole should be covered or vented to avoid fly breeding

There should be a hand washing facility attached to the latrine so that users will practice hand washing.

2. Water Protection and Use

Though water is essential for life it is incremented in harboring many disease causing organisms. Water is contaminated in many different ways at many different areas. The areas of contamination are:

At the source by surface runoffs, animals, from an underground infiltrations

When it is transported

From the cover used during transportation or storage

During storage

During water drawing from storage

Therefore, the second important barrier in the prevention of diarrhoea is to prevent of the contaminant (diarrhoea causing organisms) not to have access to water. The methods of prevention are:

Protection of the water sources so that there will not be contamination from the surface, subsurface or animals.

Cleaning water containers before fetching water

Using clean covering materials

Pouring water in clean containers is better than dipping

Drawing water from storage using ladle or pour than dipping

3. Personal Hygiene

Personal hygiene especially hand washing is the most important factor in diarrhoeal disease transmission. Mothers or caregivers

5. Domestic and Environmental Sanitation

Many disease causing organisms arise from the human environment. The immediate human environment his house and its surrounding. Over 85% of the Ethiopian population lives in the rural areas. Most of the rural people are farmers. By and large the society have animals or chicken that they raise and live with. Such animals produce waste matters, which may contribute to human infections. Waste materials such as animal dung, animals urine, solid waste, open defecation in the compound are causes of the propagation of diarrhoea and other infectious diseases.

Based on the above domains the role of the sanitarian in the prevention and control of diarrhoea is to design a hygiene education program.

Hygiene Education

It has to be understood that one of the problem for the spread of diarrhoea is lack of knowledge or information on simple preventive measures such as hand washing.

Hygiene education program should therefore be planned to help community members understand the importance of hygienic practices on the prevention of diarrhoeal diseases and promotion of health. To be successful in hygiene /health education program we should focus on the following facts.

Hygiene education should be targeted

Hygiene education should be simple (short and to the point facts has to be given to the targets)

The hygiene education program should be Convincing
(target should be able to get the point and demonstrate it)

Hygiene education program should be timely (proper time, place, and condition should be selected).

In addition preparation for hygiene education should start from the behaviour analysis. Behaviour is culture bound and hence each culture may have to be checked against norms. Establishing hygiene education program in a community for a change of behaviour that is too deeply imbedded in their culture may be difficult to have result over night.

1. Behavioral Analysis Means Understanding what the Current Behaviour of People in the Communities are with Regard to:

Hand washing

Food sanitation

Having latrine or latrine use

Water hygiene

2. Select target Behaviour

There are many ideal or feasible behaviours that health professionals wants to see people practicing, but, it may not be practical to achieve all. It is therefore necessary to select target behaviours from among many ideal ones to act upon.

For example in the case of diarrhoeal disease prevention the ideal behaviours among many will be to teach mothers on frequent hand washing after cleaning, after visiting toilet before feeding the child etc. With this target behaviour 40-50 % of diarrhoeal disease transmission will be avoided.

3. Are There Approximations that you Want to Build on

Building on local knowledge and practices is much better and short cut than to introduce new behaviours or practices.

For example people wash hands with soap after eating but not before eating

People wash hands before eating but not after latrine use

4. Communication Methods

Messages can be transmitted in many different ways. The different types of communications are:-

Person to person or what is called interpersonal communication

Group communication

Mass communication

Interpersonal

× Channels of Communication

Channels are tools and means by which message is communicated to the intended audience. The hygiene educator should prepare not only the messages but also the channels so that messages will be effectivel

Past effort in disease prevention taught us that diseases such as diarrhoea are transmitted because of sanitary defects and practices in the living environment. Unsanitary conditions and practices are performed in the house by those who are actively engaged in cleaning work, food preparation, water vending, child feeding etc. These members of the household (mothers, caretakers) are the logical primary targets.

Usually the right time and place for addressing diarrhoeal disease problem is to conduct hygiene education using an interpersonal approach and at times when the primary targets are actively engaged in households activities. Examples could be used from the actual performance of the primary audiences. The right person for this task is a person that could speak the language, share the culture but trained in hygiene education methods and principles.

2.9 Learning Activities (Case Study) Continued

Read the story of Kadija and answer the questions below

2.9.2 What was the Causative Agent (Etiological Agent) for Kedija Illness.?

2.9.2 How did she Acquired the Disease

Playing in dirty environment

From the water she drunk

From the food she ate

By using unwashed hands when eating

2.9.3 How did Contamination Occur?

from open defecation

water contaminated by runoff

Open defecation encourages fly breeding

From fomite and finger

2.9.4 What should have been performed by the family immediately after Kedija was sick

2.9.5 What should the community affected do in the future in order to save their children from dying from causes of diarrhoea?

Improve living conditions

Change their hygiene practices

Construct appropriate latrines

Protect water sources

Proper food hygiene

2.9.6 What should the health professionals do to alleviate such common problems ?

Give hygiene education to all community members

Encourage community members to construct latrines.

2.9.7 What should the government do to alleviate such common problems?

Resources Allocation

Addresses the problem

Health policy

2.9.8 What factors contributed to kadja,s death ?

2.10 Role and task Analysis

Refer to the core module unit 4

2.11 Glossary & Abbreviation

Refer to the core module Unit 5

2.12 References

Refer to the core module unit 6

2.13 Annexes

Refer to the core module unit 7

UNIT 3.4

SATELLITE MODULE FOR

PRIMARY HEALTH WORKERS(PHWs)/

COMMUNITY HEALTH WORKERS(CHWs)

UNIT 1 : INTRODUCTION

1.1 Purpose & Use of the Module

Materialization of the Community based management of diarrheal diseases is made possible through training of PHWs/CHWs that are well equipped with the basic knowledge attitude and skill of diagnosing, treating, timely referring, controlling and preventing diarrheal diseases. Therefore, this satellite module will be utilized in the training of CHW to fulfil the aforementioned purposes.

1.2 Direction for the Use of the Module

1. Administer the pretest in section 2.2.5. in unit 2 of the cord module.
2. The satellite module can be used in the training or refreshment of PHWs/ CHWs by the health center team, NGOS and other like organizations.
3. Read the core module thoroughly before using this satellite module for the training of PHWs/CHWS
4. Read the story of Kedija and try to pose practical questions to the PHW/CHWS
5. Use more participatory and simple methods of training for this group.
6. Re-administer the post-test

UNIT 2 : THE SATELLITE MODULE

2.1 Pre and Post Test

See the pre and post test for PHW/CHW in the core module section 2.1.2.5

2.2 Significance and Brief Descriptions of the Problem

The user of this module for training PHWs/CHW is highly advised to refer to the core module sections 2.2.

2.3 Learning Objectives

At the end of completing these modules the PHW/ CHWS will be able to:

a) Identify and define types of diarrhoeal diseases
b) Identify danger signs in a child with diarrhea and refer timely.
c) Demonstrate preparation of ORS and other food based ORT solutions
d) Treat a child with mild to some dehydration
e) Give health education on the prevention of diarrhoeal diseases and importance of ORS/ Food based ORT in the management of diarrhoeal diseases
f) Advise mothers/care takers on the importance of continued feeding during diarrhea

2.4 Learning Activities (Case Study)

Read kedija's story for the class(make them read) thoroughly so that they will be able discuss questions in unit 2, section 2.12 of this module.

2.5 Definition

Diarrhea is defined as passage of 3 or more loose (mucoid, bloody or water) stools in 24 hours. Sometimes the mothers' definition can be taken.

2.6 Epidemiology

Dirarrheal diseases result in the death of five million children under five years of age. About 80% of these deaths occur in the first two years of life. Children in this age group may have 5-10 attacks of diarrhea each year.

2.7 Causes

Diarrhea is caused by different germs that get in to our body through food or drink that is not hygienically handled. Unhygienic practices like not hand washing before eating and after visiting a toilet, not keeping food hygiene, not collecting, storing and using drinking water hygienically, not disposing human waste including that of children's properly and not keeping environmental hygiene.

2.8 Clinical Feature

A child with diarrhea may have the following symptoms and signs: –

He/she may be lethargic, restless, fail to drink or egger to drink, fail to produce tears upon crying, he or she may have dry tongue, buccal mucosa, fever, vomiting, poor skin turgor & low urine out put.

2.9 Diagnosis

In diagnosing the types of diarrhea & the hydration status of the child, use the following modalities:

History

- Dietary history
- Frequency of diarrhea
- Volume of diarrhea
- Consistency of diarrhea
- History of passing urine in the last 24 hours
- History of Vomiting
- History of fever

Physical Examination

- Vital signs –Pulse rate, Respiratory rate, Weight
- Buccal Mucosa – wetness of tongue
- Presence of tears upon crying
- Irritability
- Skin turgor

2.10 Case Management

- Discuss and demonstrate food based ORT
- Advise the mother/care to giver more fluid without interruption
- Breast feeding with other supplementary foods should continue
- Give ORS/ Food based ORT solution to a child with diarrhea

If the child has dangers sings of dehydration such as

Poor skin turgor

Low urine out put

Fever

Loss of interest to drink and

Bloody diarrhea refer to the next health institution urgently.

2.11 Prevention & Control

Give hygiene education on the prevention and risk factors of diarrhea

Personal hygiene (hand washing)

Environmental hygiene (housing & compound)

Food hygiene (preparation& storage)

Water hygiene (at source & at home)

Waste disposal

- Solid waste (proper disposal of refuse)
- Human excreta (latrine construction and latrine cleanness

Importance of ORS/Food based ORT in saving lives of Children with diarrhea

Importance of immunization on prevention of diarrhea

Importance of proper nutrition in prevention of diarrhea

Report to next level health facility (health center team) in the case of unusual occurrence cases of diarrhea in excess of the normal expectancy (epidemic). In so doing the CHW/PHWs are part of the diarrhea prevention and control team and participant in the whole process.

2.12 Learning Activities (Case Study) Continued

Read kedija's story for the class(make them read) if need arises, translate it into the major local languages and discuss the following question in the class.

1. How does Kedija's Parent's taking her to the traditional healer contribute to her death from diarrhea?
2. If Kedija's parents come to see you first what would you do to address her problem?
3. What other factors contribute to development of diarrhea
4. What do you think are the preventive measures?

2.13 Role and Task Analysis

Refer to the core module unit 4

2.14 Glossary & Abbreviation

Refer to the core module Unit 5

2.15 References

Refer to the core module unit 6

2.16 Annexes

Refer to the core module unit 7

UNIT 3.6

TAKE HOME MESSAGE FOR THE MOTHERS/CAREGIVERS

TAKE HOME MESSAGE FOR MOTHERS/ CAREGIVERS

The care giver should bear in mind the following messages:-

a. The three rules for home treatment of diarrhea , these are:

   Give more fluid continuously to a child with diarrhea including food based ORT according to the recipe

   Continue breast feeding and giving other supplementary foods specially more fluid diet to a child with diarrhea

   Take the child immediately to the nearest health institution if he/she has fever, vomiting, convulsion, refusal to drink or drowsiness with diarrhea

b. Get your child immunized for measles

c. Dispose the human waste (including children's excreta) and other wastes properly

d. Avoid bottles for feeding of children and infants. Instead use cup & spoon.

e. Keep the hygiene of your house and compound

f. Keep the hygiene of drinking water both at the collection site, and storage levels until it is served.

g. Keep the hygiene of food during preparation, storage and during serving.

h. Exclusively breast feed children up to 4-6 months based on their demands

UNIT FOUR

ROLE AND TASK ANALYSIS

Ethiopia Public Health Training Initiative
EPHTI

Table 4.2. Knowledge Objectives and Essential Tasks of the Health Center Team (Health Officer, Public Health Nurse, Laboratory Technician and Sanitation)

	Learning Objective (Expected out come)	HO	PHN	EH	MLT	Activities

Table 4.3 Knowledge Objectives and Essential Tasks of the Health Center Team (Health Officer, Public Health Nurse, Laboratory Technician and Sanitation)

	Learning Objective (Expected out come)	HO	PHN	EH	MLT	Activities
	Describe the pathogenesis of diarrheal diseases	-Elaborate the mechanism or development of different types of diarrheal diseases.	---	---	---	Indicate the different steps existing in the development of different types of diarrheal diseases
	Elaborate methods of preparing ORT (oral rehydration treatment) for use at home.	Elaborate methods of preparing ORT (Oral rehydration) treatment for use at home	Elaborate methods of preparing ORT (oral rehydration ttherapy) for use at home.	-----	------	Describe the different ORT9(r)-9RT9(r

Table 4.4 Attitude Objectives and Essential Tasks of the Health Center Team (Health Officer, Public Health Nurse, Laboratory Technician and Sanitation)

	Learning Objective (Expected out come)	HO	PHN	EH	MLT
Attitude	Advocate the utilization of ORS & food based ORT in reducing mortality due to DD.	Instruct CHW (community health workers) mothers and care gives in reducing mortality due to dehydration	Instruct CHW (Community health workers) mothers, and care givers in reducing mortality due to dehydration	Instruct CHW (community health workers) mothers and care givers in reducing mortality due to dehydration	Instruct CHW community health workers mothers and care givers. i reducing mortality due to dehydratio
	Promote feeding of infants (children) with case of DD	Advocate continued feeding of a child regard less of DD.	Advocate continued feeding of a child regard less of DD.	Advocate continued feeding of a child regard less of DD.	Advocate continued feeding of a child regard less of DD.
	Promote utilization of health service facilities for the treatment of diarrheal diseases in children.	Advice mothers care giver, and CHW to promote utilization of health services in DD of children.	Advice mothers care givers and CHW to promote utilization of health services. DD.	Advice mothers ,care gives and CHW to promote utilization of health services for DD in children	Advice mothers care givers and CHW to promote utilization of healt services for DD it children
	Up hold the idea that diarrhea is caused by micrograms not by evil eye or gods cures	Educate mothers, care givers and CHW that diarrhea is caused by microorganisms	Educate mothers care givers and CHW that diarrhoea is caused by microorganisms	Educate care givers and CHW that diarrhoea is caused by microorganisms	Educate care giv and CHW that diarrhoea is caus by microorganism

Table 4.5. Practice Objectives and Essential Tasks of the Health Center Team (Health Officer, Public Health Nurse, Laboratory

Knowledge	Describe the principle and treatment methods of diarrheal diseases	- Describe how to prepare ORT its administration - Describe drugs used in treatment of diarrhea & their administration	- Describe how to prepare ORS and home based ORT	- Explain metho drugs used in th care givers and - Explain the ca and give to a ca administer drug
	List the major information, methods & targets for health education in DD	Describe methods of giving health education on DD and identify target groups & areas of focus (mothers /care givers patients,)	- Explain major points to the care giver/ mothers the need to tell to the family members & the patient	- List main meth communicate in the different targ (CHW) - Enumerate ma care giver need family and the p
	List causes and risk factors for diarrheal diseases	List the different causes of diarrheal diseases and their association health risk factors.	- Explain the cause of diarrheal disease in general and what behaviors cause it.	- Explain the int factor and caus - Describe that germs of differe poor sanitation

Table 4.7. Attitude Objectives and Essential Tasks of Primary Health Worker/Community Health Workers

	Learning Objective (Expected out come)	CHW	Care giver	Activity
Attitude	Promote utilization of health service facilities for the treatment of diarrhoeal	Advice care givers to bring a child with diarrhoea to the health service units to consult health worker	Advice friends and families to visit health worker the health service units in case of diarrhoea	Educate care givers th children with diarrhoea Encourage visits healt diarrhea.
	Learning Objective Advocate utilization of ORS in reducing mortality due to DD	Community Health worker Instruct mothers or care givers the importance of ORS administration in reducing mortality from diarrhoeal diseases.	Care giver (worker) Advice family friends and neighbors to give more fluid to a child with diarrhoea.	Activity Advocate / Promote treatment of diarrhoea Encourage utilizatio family, in the treatmen
	Promote continued feeding of children with diarrhoea	Advocate and encourage proper feeling of children with diarrhea by mothers or care givers.	Feed the child with diarrhoea properly and encourage friends the peers to do so .	Emphasize on impo child with diarrhoea (Feed the child with friends or relative to c

Table 4.8 Practice Objectives and Essential Tasks of Primary Health Worker/Community Health Workers

Learning Objective (Expected out come)	CHW	Care giver	Activities
Demonstrate preparation of ORS and cereal based rehydration fluids and that proper use.	Demonstrate preparation of oral rehydration fluid and their administration to the case of diarrhoea for care takers.	Demonstrate properly prepare and administer ORT for a child with diarrhoeal diseases.	

UNIT FIVE

GLOSSARY AND ABREVIATIONS

Acute Diarrhea:- 3 or more abnormally loose or watery stools per day for less than 14

Oral Rehydration Therapy (ORT):- The administrations of fluid by mouth to prevent or correct the dehydration that is a consequence of diarrhea.

Oral Rehydration Salts (ORS):- Oral rehydration Solution

Rehydration Phase:- It is a phase on which the replacement of the accumulated deficit due to fluid and salt losses in stools and vomits are performed.

Maintenance Phase:- It is a phase on which replacement of on going abnormal losses due to continuing diarrhea and vomiting, and replacement of normal losses due to respiration, sweating and urination, which are particularly in infants are performed.

Antibiotic:- chemical substances that can kill microorganisms or stop their growth.

Auto: infection: - Infection of a person with pathogenic organisms from him/her self through fecal -oral route

Skin Torgor:- The recoiling of skin back to its original position after pinching. IF it become slower to return to its original position after pinching (if tents off) it is indicative of dehydration

UNIT SIX

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UNIT SEVEN

ANNEXS ANSWER KEY

7.1 Keys for Care Module

Q. No. 1 **D**

Q. No. 2 **A to E**

Q. No. 3 **A, B, C and E**

Q. No. 4 **A, D and E**

Q. No. 5 **A, B & E**

Q. No. 6 **A to E**

Q. No. 7 **E**

Q. No. 8 **B**

Q. No. 9 **B**

Q. No. 10 **A**

Q. No. 11 **B**

Q. No. 12 **D**

Q. No. 13 **A & B**

Q. No. 14 **E**

Q. No. 15 **B**

Q. No. 16 **D**

Q. No. 17 **B**

Q. No. 18 **B**

Q. No. 19 **D**

7.1.2 Key for the Satellite Modules

7.1.2.1 Health Officers

Q. No. 1 **A, C**

Q. No. 2 **E**

Q. No. 3 **A, to E**

Q. No. 4 **B, C and D**

Q. No. 5. **C**

Q. No. 6 **D**

Q. No. 7. **A – Invasive diarrhea**

B – Motility diarrhea

C – Osmotic diarrhea

D – Secretory diarrhea

Q. No. 8 **C**

Q. No. 9 **Yes**

Q. No. 10 **E**

7.1.2.2 Public Health Nurse

Q. No. 1 **A**

Q. No. 2 **D**

Q. No. 3 **C**

Q. No. 4 **C**

Q. No. 5 **B**

Q. No. 6 **A**

Q. No. 7 **D**

Q. No. 8 **B**

Q. No. 9 **D**

Q. No. 10 **E**

7.1.2.3 MLT

Q. No. 1. **C**

Q. No. 2. **B**

Q. No. 3. **E**

Q. No. 4. **E**

Q. No. 5. **E**

Q. No. 6. **A**

Q. No. 7. **C**

Q. No. 8. **A**

7.1.2.4 KEY for Saniterians

1. Rota virus
2. Through contaminated
   - > water
   - > food
   - Finger
   - Fomite
   - Soil

1. Poor handling of water during storage
2. At the source……contaminated soil contaminate food
   During food preparation…….poor food handling
   During storage……by flies, cockroaches and rats

5 Hand washing practice using soap or ash

6 Person to person and group.

7 30 meters away from well water and 20 meters away from kitchen or dwelling
   reason is not to contaminate underground water source and avoid fly nuisance and contamination of food.

8. Dipping hand in stored water

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